

English Translation of

PATENT ABSTRACTS OF JAPAN

(11)Publication number : 06-238574

(43)Date of publication of application : 30.08.1994

(51)Int.CI. B25B 23/157
 B25B 13/46
 B25B 23/143
 F16D 7/02

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(30)Priority

Priority number : 04336142 Priority date : 16.12.1992 Priority country : JP

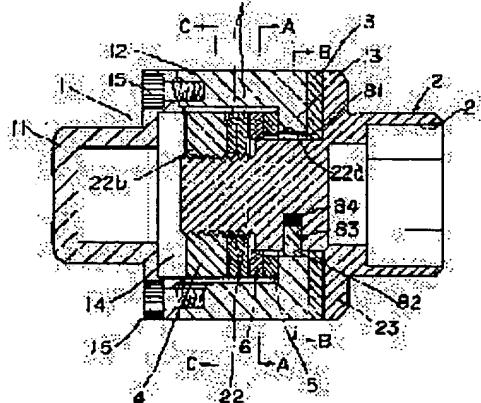
(54) CONSTANT TORQUE TIGHTENING TOOL

(57)Abstract:

PURPOSE: To set the tightening torque for a bolt in joining a construction member, etc., to a desired torque, by screwing a torque set adjusting member to a shaft part having a torque transmission member and adjusting the pressing force for an elastic member by the torque set adjusting member.

CONSTITUTION: A constant torque tightening tool which is used in tightening a screw body by a set torque is equipped with the first body 1 having an operation part 11 and the second body 2 having a holding part 21 for holding the screw body. The second body 2 has a shaft part 22 and an increased diameter part 23, and a torque

transmission part 13 supported in a relatively turnable manner on the shaft part 22 is formed on the first body 1. The first frictional plate 3 is interposed between the torque transmission part 13 and the increased diameter part 23, and a torque set adjusting member 4 is screwed on the shaft part 22. Further, the second frictional plate 5, pressing plate 6, and an elastic member 7 are interposed between the torque set



adjusting member 4 and the torque transmission part 13, and when the tightening for the screw body becomes over a prescribed tightening force, slip is generated between both the bodies 1 and 2.

LEGAL STATUS

[Date of request for examination] 27.10.1994

[Date of sending the examiner's decision of 26.05.1998
rejection]

[Claim(s)]

[Claim 1] The 1st body (1) which is the constant torque band which screw-thread objects, such as a bolt head or a nut, are ****ed, and is bound tight with setting torque in the sections screwed on, such as a hole or a **** shaft, and had a control unit (11). It has the 2nd body (2) with the attaching part (21) of said screw-thread object. One side of said 1st body (1) and 2nd body (2) It has a shank (22) and path voluminousness (23). Another side It has the torque-transmission section (13) supported pivotable. said shank (22) -- relativity -- The 1st file plate (3) intervenes between this torque-transmission section (13) and said path voluminousness (23), and set torque controller material (4) is screwed in said shank (22). Between this set torque controller material (4) and said torque-transmission section (13) The constant torque band characterized by intervening the elastic member (7) which presses down with the 2nd file plate (5) and presses a plate (6) and said 1st and 2nd file plates (3), and (5) in said torque-transmission section (13).

[Claim 2] At the time of the rotation to the direction with a bundle of the **** object according to said control unit (11) of said 1st body (1) to between the 1st body (1) and the 2nd body (2) A constant torque band [equipped with the one direction rolling mechanism (8) which makes said 1st body (1) pivotable to the 2nd body (2), and makes really pivotable said 1st body (1) and 2nd body (2) at the time of the rotation to the return direction of said screw-thread object] according to claim 1.

[Claim 3] One side of the 1st body (1) and the 2nd body (2) It has the space section (14) and the torque-transmission section (13) which goes in this space section (14). Another side It has said space section (path voluminousness (23 which counters the shank (22) inserted in 14), and said torque-transmission section (13)). The 1st file plate (3) is infix between this path voluminousness (23) and external surface of said torque-transmission section (13). Set torque controller material (4) is screwed in said shank (22) inserted in said space section (14), and between this controller material (4) and the inside of the torque-transmission section (13) which goes to said space section (14) The constant torque band according to claim 1 between which the 2nd file plate (5), the presser-foot plate (6), and the elastic member (7) are made to be placed.

[Claim 4] The constant torque band according to claim 1 which forms the grip section

(16) prolonged toward the method of the outside of the direction of a path in the control unit (11) of the 1st body (1).

[Detailed Description of the Invention]

[0001]

[Industrial Application] In order to combine the steel materials in the Building Department material etc., in case this invention fixes between said steel materials by bolting of a bolt or a nut through joint material, it relates to the constant torque band bound tight with the setting torque set up beforehand.

[0002]

[Description of the Prior Art] Although it is made to carry out bolt association of between said steel materials through joint material in order to combine the steel materials in the Building Department material etc. conventionally, a plane of composition is processed on a split face with shot blasting etc., and he raises coefficient of friction, and is trying to join by synthesis with the frictional force between planes of composition, and the force with a suspension, in order that the junction to said steel materials and joint material may raise the shear strength of said bolt at this time. However, if a bolt is bound tight to extent exceeding the yield point when combining between steel materials by the friction joint as mentioned above, the effectiveness by the friction joint of a plane of composition will decline, shearing force will act on said bolt itself, and the problem to which bolt proof stress falls will arise. Then, it is necessary to bind this bolt tight by predetermined clamping force, and for this reason, when performing a friction joint like the above, it sets. Clamping the point of this share bolt using a share bolt with the shear section which will be sheared if the force joins the point of a bolt more than predetermined stress If the nut is bound tight and it becomes a certain predetermined clamping force, said shear section shears, bolting by the clamping force beyond it is made into impossible, and that which was bound tight by the predetermined mounting torque set up with said share bolt is proposed.

[0003]

[Problem(s) to be Solved by the Invention] However, when using said share bolt, it is necessary to prepare specially the exclusive bolt of the special structure which prepared said shear section. In case said share bolt is bound tight, there is not only a problem used as cost quantity, but In case the support of the dedication which clamps the point of this share bolt is needed and it ends with a bundle When the shear section of said share bolt is sheared, this shear section may have deserted the body of a bolt, and may have fallen depending on the case and it worked especially at an altitude of a skyscraper etc., there was a possibility that a falling object might ask people.

[0004] Therefore, this invention aims at offering the constant torque band bound tight by the clamping force of arbitration, not using a special share bolt but being able to use a general-purpose bolt.

[0005]

[Means for Solving the Problem] In the constant torque band which screw-thread objects, such as a bolt head or a nut, are ****ed, and is bound tight with setting torque in the sections screwed on, such as a hole or a **** shaft, in order that this invention may attain the above-mentioned purpose It has the 1st body 1 with a control unit 11, and the 2nd body 2 with the attaching part 21 of said screw-thread object. One side of said 1st body 1 and 2nd body 2 It has the torque-transmission section 13 supported pivotable. a shank 22 and path voluminousness 23 having another side of said shank 22 relativity. The 1st file plate 3 intervenes between this torque-transmission section 13 and said path voluminousness 23, and the set torque controller material 4 is screwed in said shank 22. Between this set torque controller material 4 and said torque-transmission section 13 The elastic member 7 which presses down with the 2nd file plate 5 and presses a plate 6 and said 1st and 2nd file plates 3 and 5 in said torque-transmission section 13 was made to intervene.

[0006] Moreover, it is desirable to have the one direction rolling mechanism 8 which makes said 1st body 1 pivotable to the 2nd body 2, and makes really pivotable said 1st body 1 and 2nd body 2 between said 1st body 1 and 2nd body 2 at the time of the rotation to the return direction of said screw-thread object at the time of the rotation to the direction with a bundle of the **** object by said control unit 11 of said 1st body 1.

[0007] Moreover, one side of said 1st body 1 and 2nd body 2 It has the space section 14 and the torque-transmission section 13 which goes in this space section 14. Another side It has 23. the shank 22 inserted in said space section 14, and the path voluminousness which counters said torque-transmission section 13. The 1st file plate 3 is infix between this path voluminousness 23 and external surface of said torque-transmission section 13. The set torque controller material 4 is screwed in said shank 22 inserted in said space section 14, and you may make it make the 2nd file plate 5, the presser-foot plate 6, and an elastic member 7 intervene between this controller material 4 and the inside of the torque-transmission section 13 which goes to said space section 14.

[0008] Moreover, it is desirable to form the grip section (16) prolonged toward the method of the outside of the direction of a path in the control unit (11) of said 1st body (1).

[0009]

[Function] By screwing said set torque controller material 4 to said shank 22, and adjusting the thrust to said elastic member 7 by this set torque controller material 4 The transfer torque from the 1st body 1 to the 2nd body 2 with the attaching part 21 of said screw-thread object with said control unit 11 is adjusted. Only by mounting torque being set as desired torque and adjusting the thrust of said set torque controller material 4 If the load with a bundle which can set it as the torque of a request of the mounting torque when binding said screw-thread object tight, and acts on said 2nd body 2 exceeds the mounting torque set up beforehand Said 1st body 1 can slip to the 2nd body 2, can make bolting beyond it impossible, and can bind said screw-thread object

tight with predetermined torque.

[0010] Moreover, since a **** object can use the general-purpose bolt marketed widely by using the constant torque band of this invention, without using a special share bolt. As compared with the former which needed to use the share bolt, can mitigate sharply and cost The tool for carrying out rotation actuation of the control unit 11 of said 1st body 1 can also use the general ratchet wrench, and since fall of a bolt point when using the share bolt like the top before can also be lost, the danger of being based on fall can also be abolished.

[0011] At moreover, the time of the rotation to the direction with a bundle of the **** object according to said control unit 11 of said 1st body 1 to between said 1st body 1 and 2nd body 2 By making said 1st body 1 pivotable to the 2nd body 2, and having the one direction rolling mechanism 8 which makes really pivotable said 1st body 1 and 2nd body 2 at the time of the rotation to the return direction of said screw-thread object the bolt bound tight -- it is necessary to remove -- moreover -- this bolt -- rusted -- etc. -- it is generated, and it can loosen, without making the 1st body 1 slip to the 2nd body 2, even when it ****s by the larger force than the clamping force of a constant torque band and the body must be loosened.

[0012] Moreover, the shank 22 which equips one side of said 1st body 1 and 2nd body 2 with the space section 14 and the torque-transmission section 13 which goes in this space section 14, and is inserted in another side at said space section 14, Have 23, infix the 1st file plate 3 between this path voluminousness 23 and external surface of said torque-transmission section 13, and the set torque controller material 4 is screwed in said shank 22 inserted in said space section 14. the path voluminousness which counters said torque-transmission section 13 -- When the 2nd file plate 5, the presser foot plate 6, and an elastic member 7 are intervened between this controller material 4 and the inside of the torque-transmission section 13 which goes to said space section 14 Since the interior of said set torque controller material 4 is carried out to said space section 14, said set torque controller material 4 is covered with said 1st body 1. It can prevent changing carelessly the clamping force set up by this set torque controller material 4 according to external force, and the mounting torque set up beforehand can be maintained effectively.

[0013] Moreover, since a part of band which had the grip section [bolting / the section] with constant torque by forming the grip section 16 prolonged toward the method of the outside of the direction of a path in the control unit 11 of said 1st body 1 can be formed in elegance Bolting [with said grip section 16 / said screw-thread object] immediately after ****ing this constant torque band and doubling with the body When removing this ratchet wrench to the back with [by this ratchet wrench] a bundle moreover, without doing an activity which inserts in a ratchet wrench etc. specially and binds it tight to the control unit 11 of a constant torque band in case a screw-thread object is bound tight Said constant torque band ****s, it is not necessary to pay attention to separating and sliding down from the body, and a bolting activity can be done easily.

[0014]

[Example] The 1st example in the constant torque band of this invention is explained based on a drawing.

[0015] The 1st body 1 with the control unit 11 which the constant torque band shown in drawing 1 fits in a ratchet wrench etc., and carries out possible [of the actuation with a bundle]. It consists of the 2nd body 2 with the attaching part 21 which holds screw-thread objects, such as a bolt which combines two steel materials, or a nut, to relative rotation impossible. said 2nd body 2 -- a shank 22 and path voluminousness 23 -- forming -- said 1st body 1 -- said shank 22 -- relativity -- the torque-transmission section 13 supported pivotable is formed.

[0016] Specifically, said 1st body 1 is formed by making external surface into the shape of a hexagon from said control unit 11 which prepared the flange in the die-length direction inside, and the cylinder part 12 combined with attachment and detachment impossible with two or more bolts 15 at the flange of this control unit 11, as shown in drawing 1 and drawing 6 . And by said control unit 11 and said cylinder part 12, while forming the space section 14 in said cylinder part 12 interior, the torque-transmission section 13 prolonged toward the inside of said space section 14 in the disconnection side of said cylinder part 12 is formed in one. In addition, said control unit 11 forms the core in a cavernous condition so that said space section 14 may be followed, and it is attaining lightweight-ization.

[0017] Moreover, as shown in drawing 1 and drawing 7 , said 2nd body 2 makes an inside the shape of a hexagon, receives said screw-thread object, and it forms said attaching part 21 which consists of the crevice which binds this **** object tight and can do it. Said shanks 22 are formed successively inside this attaching part 21, and said path voluminousness 23 which has a larger path than the path of these shanks 22 and an attaching part 21 between this shank 22 and said attaching part 21 is formed continuously. And as shown in drawing 2 $R > 2$, while forming torque-transmission section fit-in section 22a with the circular peripheral face which fits the torque-transmission section 13 of said 1st body 1 in said path voluminousness 23 side of said shank 22, thread-part 22b is formed in the toe side periphery of said shank 22. In addition, when said attaching part 21 makes a disconnection side the shape of a hexagon, it forms it so that it may have circular inner skin in an inner, and it holds a nut in said hexagon-like section, he is trying to accept the point of a bolt by the inner which consists of said circular inner skin.

[0018] And as said space section 14 of said cylinder part 12 in said 1st body 1 countered in the external surface of said torque-transmission section 13, and said path voluminousness 23 of said 2nd body 2 Insert in said shank 22 and the 1st file plate 3 is intervened between the external surface of said torque-transmission section 13, and said path voluminousness 23 at this time. moreover, to said thread-part 22b of said shank 22 The set torque controller material 4 which formed the notching 41 for rotation actuation in the periphery section as shown in drawing 5 is screwed. Between this set

torque controller material 4 and the inside of said torque-transmission section 13. The elastic members 7 and 7 which press the 2nd file plate 5, and the presser-foot plate 6 and said 1st and 2nd file plates 3 and 5 in said torque-transmission section 13 and which consist mainly of a disk spring are made to intervene. Said set torque controller material 4, the 2nd file plate 5, the presser-foot plate 6, and said elastic member 7 are formed so that it may be settled in said cylinder part 12.

[0019] moreover, between said torque-transmission section 13 and torque-transmission section fit-in section 22a At the time of the rotation to the direction with a bundle of said screw-thread object by said control unit 11 of said 1st body 1 Said 1st body 1 is made pivotable to the 2nd body 2. At the time of the rotation to the return direction of said screw-thread object The one direction rolling mechanism 8 which makes really pivotable said 1st body 1 and 2nd body 2 is formed. This one direction rolling mechanism 8 As shown in drawing 4 , while forming two or more ratchet slots 81 which allow the inner skin used as an opposed face with said torque-transmission section fit-in section 22a of said torque-transmission section 13 the rotation to an one direction While forming the pin acceptance hole 83 which receives in said torque-transmission section fit-in section 22a the pin 82 which fits into said ratchet slot 81 and carrying out the interior of said pin 82 to this pin acceptance hole 83 at attitude freedom A spring 84 is arranged in the tooth-back side of said pin 82, and this pin 82 is energized in the direction which fits into said RACHIEETO slot 81.

[0020] In addition, slot 22c for surroundings stops of a pair is formed, and said presser-foot plate 6 is supported to relative rotation impossible at said torque-transmission section fit-in section 22a so that the projections 61 and 61 of the pair formed in the inner skin side of said presser-foot plate 6 may fit in at said torque-transmission section fit-in section 22a, as shown in drawing 2 and drawing 3 .

[0021] After inserting in said 1st file plate 3 first so that said path voluminousness 23 may be countered from said shank 22 side if attachment of a torque band is explained, said cylinder part 12 is fitted in. next, said law -- After fitting in said shank 22 in order of said 2nd file plate 5, said presser-foot plate 6, and said elastic members 7 and 7, Bind tight so that said set torque controller material 4 may be screwed in said shank 22 and said presser-foot plate 6 may press said 1st and 2nd file plates 3 and 5 by said elastic members 7 and 7, and it is set as predetermined mounting torque. After an appropriate time, said control unit 11 is fixed to said cylinder part 12 with two or more screws 15.

[0022] In addition, although a setup of said mounting torque is performed using a torque wrench or a load cell and it may be made to carry out at the time of screwing of said controller material 4, the degree screwing of predetermined time of said controller material 4 is carried out, and it may be made to carry out after fixing said control unit 11 to a cylinder part 12.

[0023] Moreover, while forming accommodation of said controller material 4 so that said cylinder part 12 may be countered 180 degrees in two or more long holes along a hoop direction It forms so that the peripheral face of said set torque controller material 4 may

similarly be countered 180 degrees in two or more crevices or holes. After carrying out the degree screwing of predetermined time of said controller material 4 until it counters said long hole, and fixing said control unit 11 to a cylinder part 12, To the crevice or hole of a pair in said set torque controller material 4 which has countered 180 degrees, from the long hole of said cylinder part 12 Said pin section of a rotation actuation implement with the pin section which can fit into this crevice or a hole is inserted in, said set torque controller material 4 is rotated, and you may make it adjust mounting torque.

[0024] When ****(ing), in spite of covering said shank 22 and the set torque controller material 4 by said 1st body 1, mounting torque can be set up freely.

[0025] Carry out a deer and the torque band in the 1st above mentioned example By screwing said set torque controller material 4 to said shank 22, and adjusting the thrust to said elastic member 7 by this set torque controller material 4 The transfer torque from the 1st body 1 to the 2nd body 2 with the attaching part 21 of said screw-thread object with said control unit 11 is adjusted. Only by mounting torque being set as desired torque and adjusting the thrust of said set torque controller material 4 If the load with a bundle which can set it as the torque of a request of the mounting torque when binding said screw-thread object tight, and acts on said 2nd body 2 exceeds the mounting torque set up beforehand Said 1st body 1 can slip to the 2nd body 2, can make bolting beyond it impossible, and can bind said screw-thread object tight with predetermined torque.

[0026] Moreover, since a **** object can use the general-purpose bolt marketed widely by using the constant torque band of this invention, without using a special share bolt As compared with the former which needed to use the share bolt, can mitigate sharply and cost The tool for carrying out rotation actuation of the control unit 11 of said 1st body 1 can also use the general ratchet wrench, and since fall of a bolt point when using the share bolt like the top before can also be lost, the danger of being based on fall can also be abolished.

[0027] Therefore, this invention can bind the bolt tight by the clamping force of arbitration, not using a special share bolt but being able to use a general-purpose bolt.

[0028] At moreover, the time of the rotation to the direction with a bundle of the **** object according to said control unit 11 of said 1st body 1 to between said 1st body 1 and 2nd body 2 By making said 1st body 1 pivotable to the 2nd body 2, and having the one direction rolling mechanism 8 which makes really pivotable said 1st body 1 and 2nd body 2 at the time of the rotation to the return direction of said screw-thread object the bolt bound tight -- it is necessary to remove -- moreover -- this bolt -- rusted -- etc. -- it is generated, and it can loosen, without making the 1st body 1 slip to the 2nd body 2, even when it ****s by the larger force than the clamping force of a constant torque band and the body must be loosened.

[0029] Moreover, since the interior of said set torque controller material 4 is carried out to said space section 14, said set torque controller material 4 can be covered with said 1st body 1, it can prevent changing carelessly the clamping force set up by this set

torque controller material 4 according to external force, and the mounting torque set up beforehand can be maintained effectively.

[0030] In addition, two or more presser foot plates 6 which fit into said shank 22 may be used not only in one sheet, and the number of said elastic members 7 and 7 one, and they may be used several many sheets, and not only a disk spring but coiled spring is sufficient as them. When using said two or more presser foot plates 6, it is desirable to pile up this presser foot plate 6 and said elastic member 7 by turns.

[0031] Moreover, although said attaching part 21 forms an inside in the shape of a hexagon and inserted the bolt head and the nut in this hexagon-like section, it is made into a chuck method and you may make it hold a bolt head and a nut so that said attaching part 21 can respond to change of the magnitude of a bolt head or a nut.

[0032] Furthermore, in order to set up mounting torque, you may enable it to perform set torque easily by forming a torque accommodation graduation in said shank 22 and said set torque controller material 4, as shown in drawing 1515.

[0033] Next, the 2nd example is explained. A different point from said 1st example of this 2nd example only made reverse the ratchet slot and pin of said one direction rolling mechanism 8.

[0034] That is, as shown in drawing 8 thru/or drawing 11, while forming the pin acceptance hole 83 which receives a pin 82 in the inner skin of said torque-transmission section 13 formed in said cylinder part 12 and carrying out the interior of said pin 82 and spring 83 to it, said pin 82 fits into said torque-transmission section fit-in section 22a in said shank 22, and two or more ratchet slot 81a which allows the rotation to an one direction is formed.

[0035] Moreover, since the path of the inner skin of said 1st file plate 3 is formed greatly and the direction dimension of a path of the part which receives said 1st file plate 3 in said shank 22 is greatly formed in the 2nd above mentioned example When the receptacle section of the bolt in said attaching part 21 can be formed in the inner direction and ****(ed) rather than the formation location of an attaching part 21 shown in drawing 8, only the part which forms said attaching part 21 in the inner direction can shorten the die length of the constant whole torque band.

[0036] Moreover, as said 1st file plate 3 forms a step in the opposed face side of said path voluminousness 23 in said torque-transmission section 13 so that said pin acceptance hole 83 may not be influenced, and it inserts said 1st file plate 3 in this step, you may make it arrange it so that it may become in an unsymmetrical location to said 2nd file plate 5 and said torque-transmission section 13.

[0037] In addition, like [although each above mentioned example formed said 1st body 1 from the control unit 11 and the cylinder part 12] the 3rd example shown in drawing 12, as tabular, said 1st body 1 may form a control unit 11 in the periphery section, and may form said torque-transmission section 13 in the inner circumference section. In this case, it is desirable to form the wrap covering 9 for said 2nd file plate 5 which fits into this shank 22, the presser foot plate 6, elastic members 7 and 7, and the set torque

controller material 4, to **** the center section of this covering 9 to the point of said shank 22, and to fix to said shank 22 in said 2nd body 2 by 91.

[0038] Since the die length of said control unit 11 and said attaching part 21 can be shortened when ****(ing), the torsion stress concerning a constant torque band can be mitigated, and generating of **** can also be lessened.

[0039] Moreover, although the torque-transmission section 13 was formed in said 1st body 1 and it formed a shank 22 and path voluminousness 23 in the 2nd body 2, even if each above mentioned example forms a shank and path voluminousness in said 1st body 1 and forms the torque-transmission section in the 2nd body 2, it does not interfere.

[0040] Moreover, although it was made bolting in said each example by making said attaching part 21 into the shape of a hexagon doubled with the configuration of a bolt head or a nut, and fitting a direct bolt head or a nut into this attaching part 21 Form the inside of said attaching part 21 for example, in the shape of a square, as shown in drawing 13 , have a hexagon-like inner area smaller than the area of the inside of said attaching part 21, and the socket 92 which can fit into said attaching part 21 is fitted into said attaching part 21. It escapes from said socket 92 to said attaching part 21, and may make it attach removable by the stop 93, and, similarly the inside of said attaching part 21 is formed in the shape of a square. As shown in drawing 14 , the socket 94 which had the fitting section which can fit into said attaching part 21 in ** and another side for the larger hexagon-like inner area section than the area of the inside of said attaching part 21 is fitted into one side at said attaching part 21. It is, even if it escapes from said socket 94 to said attaching part 21 and makes it attach removable by the stop 93, and it is **. It escapes and said spring 95 which energizes this omission stop 93 to the inside side of said attaching part 21 is arranged in the tooth-back side of a stop 93.

[0041] When ****(ing), said sockets 92 and 94 are prepared independently and said sockets 92 and 94 are only exchanged according to the magnitude of a bolt or a nut, and even if the magnitude of these bolts or a nut changes, it can bind tight with one constant torque band. In addition, although said attaching part 21 was formed in tubed, an appearance forms in a polygon-like shaft and a tubed socket may be made to fit into the external surface of this shaft in said each example shown in drawing 13 and drawing 14 R> 4.

[0042] When the 4th example is shown in drawing 16 and drawing 17 , moreover, this example While combining a ratchet wrench with the control unit 11 of said 1st body 1 at one, forming said 1st body 1 in tubed one with a stage, forming two or more tooth part 11a in the major diameter periphery of this 1st body 1 and constituting a control unit 11 In the method of the inside of the cylinder part 12 which turns into a narrow diameter portion with the outer diameter of a minor diameter from this control unit 11 The interior of said 2nd file plate 5 which fits into said shank 22, the presser-foot plate 6, elastic members 7 and 7, and the set torque controller material 4 is carried out, and it covers in said narrow diameter portion 12, and said torque-transmission section 13 is formed in the inner circumference section corresponding to said control unit 11.

Moreover, the wrap covering 9 is formed for the cylinder part 12 opening side of said 1st body 1, the center section of this covering 9 is ****ed to the point of said shank 22, and it is fixing to said shank 22 in said 2nd body 2 by 91.

[0043] The grip section 16 prolonged from said 1st body 1 periphery section to the method of the outside of the direction of a path is attached in said control unit 11. And to the die-length direction 1 side of the grip section 16 While preparing frame-like boss section 16a which fits into said control unit 11 which consists of two or more tooth part 11a, to said boss section 16a Pawl maintenance space 16c which carries out opening is prepared in the inside dead air space of this boss section 16a. To this space 16c While pivoting the corpus unguis 17 with two claw parts 17a and 17b which engage with tooth part 11a of said control unit 11, and enable the switch of the direction with a bundle of a **** object possible [a switch] through pin 16d The corpus-unguis change-over maintenance device which consists of ball 16e which energizes said corpus unguis 17 to tooth part 11a of said control unit 11, and holds the switch location of said corpus unguis 17, and 16f of springs is established.

[0044] A deer is carried out. By the above configuration said grip section 16 A ratchet wrench will be constituted with said control unit 11. By switching and fastening said corpus unguis 17 and engaging claw part 17a for a lump to tooth part 11a of said control unit 11, can transmit one direction **** actuation of said grip section 16 to the 1st body 1 from said control unit 11, and the other directions double action actuation is made free. Drive rotation of said 1st body 1 will be carried out by both-way actuation of said grip section 16 in an one direction, it will **** through the attaching part 21 of said 2nd body 2, and a fasten lump of the body can be performed.

[0045] Moreover, by said corpus unguis's 17 fastening and engaging claw part 17b for return to tooth part 11a of said control unit 11, in said actuation, conversely, the other directions double action actuation can be transmitted to the 1st body 1 from said control unit 11, using one direction **** actuation of said grip section 16 as free, and fasten return of said screw-thread object can be performed by both-way actuation of said grip section 16.

[0046] Moreover, said grip section 16 prepares 16g of inward-flange sections which have the inner skin made into the minor diameter from the major diameter which constitutes said control unit 11 in said 1st body 1 in the shaft-orientations 1 side of said frame-like boss section 16a. 16g of this flange is made to engage with the step formed between said major diameters and narrow diameter portions 12, and said grip section 16 is held on said 1st body 1 at balking impossible by making 16g of said flanges pinch by this step and the edge of said covering 9 attached in said shank 22.

[0047] Since said grip section 16 is attached by the 1st body 1 by ****(ing) at balking impossible, it grasps with the constant torque band which consists of said 1st body 1 and 2nd body 2, and the section 16 is made to elegance in part. Like the 1st example Bolting [with said grip section 16 / said screw-thread object] immediately after not carrying out fitting of the ratchet wrench at the time of actuation with a bundle, ****ing

said constant torque band and carrying out fitting to the body In case it ****s like the 1st example and the body is bound tight, the activity which inserts a ratchet wrench in the control unit 11 of a constant torque band specially is done unnecessary. When workability can be improved so much and this ratchet wrench is moreover removed to the back with [by the ratchet wrench] a bundle It is not necessary to pay attention so that said constant torque band may ****, and it can prevent separating and sliding down from the body, therefore it may not fall at the time of an activity, and a bolting activity can be done so much easily.

[0048] Moreover, although said grip section 16 was made into the ratchet-wrench format, form in boss section 16a of said grip section 16 16h of tooth parts which engage with the tooth part of said control unit 11, it is made to carry out fitting of this boss section 16a to said 1st body 1, and you may make it combine said control unit 11 with it to relative rotation impossible in said 4th example like the 5th example shown in drawing 18 . At this time, anchoring to said 1st body 1 of said grip section 16 attaches in the periphery section of this 1st body 1 snap-ring 16i which stops said frame part 16a, and as it is pinched by this snap-ring 16i and the edge of covering 9, it holds it.

[0049] Moreover, said grip section 16 may really be formed in said 1st body 1.

[0050]

[Effect of the Invention] As explained above, the constant torque band of this invention It has the 1st body 1 with a control unit 11, and the 2nd body 2 with the attaching part 21 of said screw-thread object. One side of said 1st body 1 and 2nd body 2 It has the torque-transmission section 13 supported pivotable. a shank 22 and path voluminousness .. 23 .. having .. another side .. said shank 22 .. relativity .. The 1st file plate 3 intervenes between this torque-transmission section 13 and said path voluminousness 23, and the set torque controller material 4 is screwed in said shank 22. Between this set torque controller material 4 and said torque-transmission section 13 Since the elastic member 7 which presses down with the 2nd file plate 5 and presses a plate 6 and said 1st and 2nd file plates 3 and 5 in said torque-transmission section 13 was made to intervene, said set torque controller material 4 is screwed to said shank 22. By adjusting the thrust to said elastic member 7 by this set torque controller material 4 The transfer torque from the 1st body 1 to the 2nd body 2 with the attaching part 21 of said screw-thread object with said control unit 11 is adjusted. Only by mounting torque being set as desired torque and adjusting the thrust of said set torque controller material 4 If the load with a bundle which can set it as the torque of a request of the mounting torque when binding said screw-thread object tight, and acts on said 2nd body 2 exceeds the mounting torque set up beforehand Said 1st body 1 can slip to the 2nd body 2, can make bolting beyond it impossible, and can bind said screw-thread object tight with predetermined torque.

[0051] Moreover, since a *** object can use the general-purpose bolt marketed widely by using the constant torque band of this invention, without using a special share bolt As compared with the former which needed to use the share bolt, can mitigate sharply

and cost The tool for carrying out rotation actuation of the control unit 11 of said 1st body 1 can also use the general ratchet wrench, and since fall of a bolt point when using the share bolt like the top before can also be lost, the danger of being based on fall can also be abolished.

[0052] At moreover, the time of the rotation to the direction with a bundle of the **** object according to said control unit 11 of said 1st body 1 to between said 1st body 1 and 2nd body 2 By making said 1st body 1 pivotable to the 2nd body 2, and having the one direction rolling mechanism 8 which makes really pivotable said 1st body 1 and 2nd body 2 at the time of the rotation to the return direction of said screw-thread object the bolt bound tight -- it is necessary to remove -- moreover -- this bolt -- rusted -- etc. -- it is generated, and it can loosen, without making the 1st body 1 slip to the 2nd body 2, even when it ****s by the larger force than the clamping force of a constant torque band and the body must be loosened.

[0053] Moreover, the shank 22 which equips one side of said 1st body 1 and 2nd body 2 with the space section 14 and the torque-transmission section 13 which goes in this space section 14, and is inserted in another side at said space section 14, Have 23, infix the 1st file plate 3 between this path voluminousness 23 and external surface of said torque-transmission section 13, and the set torque controller material 4 is screwed in said shank 22 inserted in said space section 14. the path voluminousness which counters said torque-transmission section 13 -- When the 2nd file plate 5, the presser-foot plate 6, and an elastic member 7 are intervened between this controller material 4 and the inside of the torque-transmission section 13 which goes to said space section 14 Since the interior of said set torque controller material 4 is carried out to said space section 14, said set torque controller material 4 is covered with said 1st body 1. It can prevent changing carelessly the clamping force set up by this set torque controller material 4 according to external force, and the mounting torque set up beforehand can be maintained effectively.

[0054] Moreover, by forming the grip section 16 prolonged toward the method of the outside of the direction of a path in the control unit 11 of said 1st body 1 Since it is not necessary to prepare fixtures, such as a ratchet wrench, independently, said grip section is included in a band and it is made to elegance in part Bolting [with said grip section 16 / said screw-thread object] immediately after ****ing this constant torque band and doubling with the body When removing this ratchet wrench to the back with [by this ratchet wrench] a bundle moreover, without doing an activity which inserts in a ratchet wrench etc. specially and binds it tight to the control unit 11 of a constant torque band in case a screw-thread object is bound tight Said constant torque band ****s, it is not necessary to pay attention to separating and sliding down from the body, and a bolting activity can be done easily.

[Brief Description of the Drawings]

[Drawing 1] It is drawing of longitudinal section of the 1st example in the constant

torque band of this invention.

[Drawing 2] the shank of the 2nd body in the 1st example was shown -- it is a notching side elevation a part.

[Drawing 3] It is the A-A sectional view of drawing 1 .

[Drawing 4] It is the B-B sectional view of drawing 1 .

[Drawing 5] It is the C-C sectional view of drawing 1 .

[Drawing 6] It is the front view seen from the 1st body side of drawing 1 .

[Drawing 7] It is the rear view seen from the 2nd body side of drawing 1 .

[Drawing 8] It is drawing of longitudinal section of the 2nd example in the constant torque band of this invention.

[Drawing 9] the shank of the 2nd body in the 2nd example was shown -- it is a notching side elevation a part.

[Drawing 10] It is the D-D sectional view of drawing 1 .

[Drawing 11] It is the E-E sectional view of drawing 1 .

[Drawing 12] It is drawing of longitudinal section of the 3rd example in the constant torque band of this invention.

[Drawing 13] drawing which attached the socket in the attaching part in the constant torque band of this invention is shown -- it is a notching sectional view a part.

[Drawing 14] drawing which attached the socket in the attaching part in the constant torque band of this invention is shown -- it is a notching sectional view a part.

[Drawing 15] It is the drawing which formed the torque accommodation graduation in the shank and set torque controller material in a constant torque band of this invention.

[Drawing 16] It is partial drawing of longitudinal section of the 4th example in the constant torque band of this invention.

[Drawing 17] It is a F-F fragmentary sectional view in the 4th example of drawing 16 .

[Drawing 18] It is partial drawing of longitudinal section of the 5th example in the constant torque band of this invention.

[Description of Notations]

1 1st Body

11 Control Unit

13 Torque-Transmission Section

14 Space Section

16 Grip Section

2 2nd Body 21
 Attaching Part

22 Shank

23 Path Voluminousness

3 1st File Plate

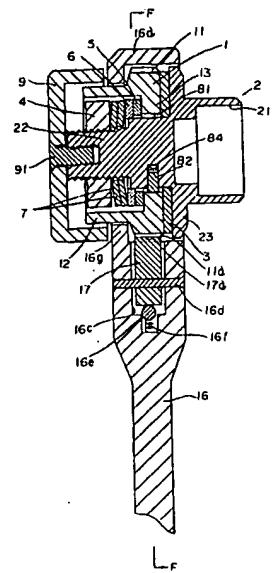
4 Set Torque Controller Material

5 2nd File Plate

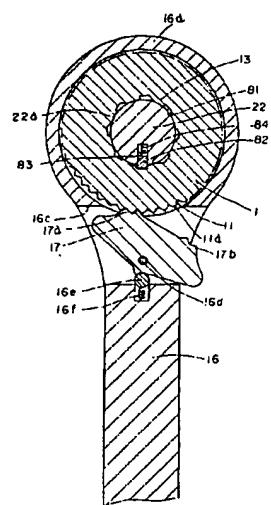
6 Presser-Foot Plate

7 Elastic Member

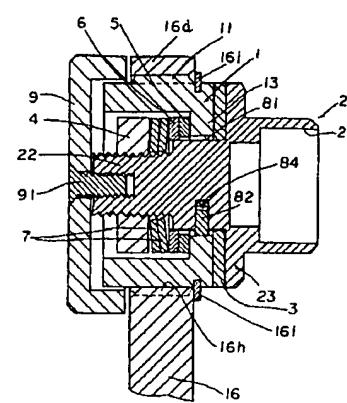
[Drawing 16]



[Drawing 17]



[Drawing 18]



CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law

[Section partition] The 3rd partition of the 2nd section

[Publication date] December 19, Heisei 7 (1995)

[Publication No.] Publication number 6-238574

[Date of Publication] August 30, Heisei 6 (1994)

[Annual volume number] Open patent official report 6-2386

[Application number] Japanese Patent Application No. 5-47934

[International Patent Classification (6th Edition)]

B25B 23/157 B 7181-3C

13/46 7234-3C

23/143 7181-3C

F16D 7/02 A 8508-3J

[Procedure revision]

[Filing Date] October 27, Heisei 6

[Procedure amendment 1]

[Document to be Amended] Specification

[Item(s) to be Amended] 0034

[Method of Amendment] Modification

[Proposed Amendment]

[0034] That is, as shown in drawing 8 thru/or drawing 11, while forming the pin acceptance hole 83 which receives a pin 82 in the inner skin of said torque-transmission section 13 formed in said cylinder part 12 and carrying out the interior of said pin 82 and spring 84 to it, said pin 82 fits into said torque-transmission section fit-in section 22a in said shank 22, and two or more ratchet slot 81a which allows the rotation to an one direction is formed.

[Procedure amendment 2]

[Document to be Amended] Specification

[Item(s) to be Amended] 0045

[Method of Amendment] Modification

[Proposed Amendment]

[0045] Moreover, by said corpus unguis's 17 fastening and engaging claw part 17b for return to tooth part 11a of said control unit 11, contrary to said actuation, the other directions double action actuation can be transmitted to the 1st body 1 from said control unit 11, using one direction **** actuation of said grip section 16 as free, and fasten return of said screw-thread object can be performed by both-way actuation of said grip section 16.

[Procedure amendment 3]

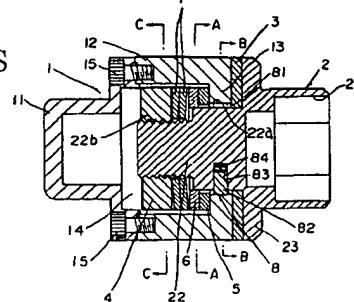
[Document to be Amended] DRAWINGS

[Item(s) to be Amended] drawing 1

[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 1]



[Procedure amendment 4]

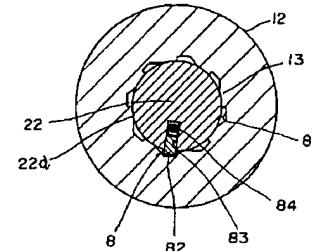
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[Item(s) to be Amended] drawing 4

[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 4]



[Procedure amendment 5]

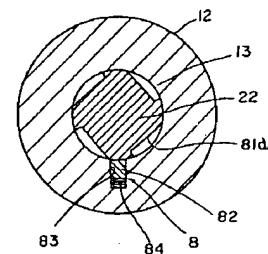
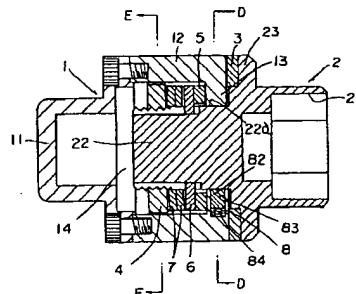
[Document to be Amended] DRAWINGS

[Item(s) to be Amended] drawing 8

[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 8]



[Procedure amendment 6]

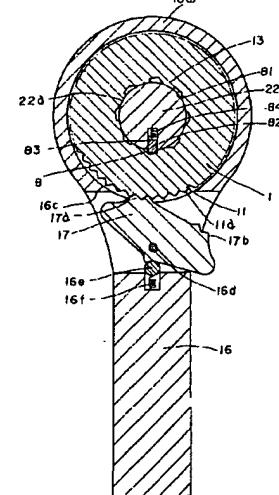
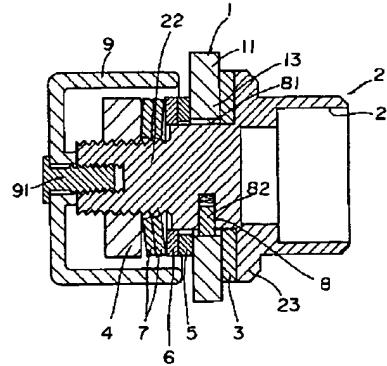
[Document to be Amended] DRAWINGS

[Item(s) to be Amended] drawing 10

[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 10]



[Procedure amendment 7]

[Document to be Amended] DRAWINGS

[Item(s) to be Amended] drawing 12

[Method of Amendment] Modification

[Proposed Amendment]

[Drawing 12]

(19)日本国特許庁 (JP)

(12) 公開特許公報 (A)

(11)特許出願公開番号

特開平6-238574

(43)公開日 平成6年(1994)8月30日

(51)Int.Cl.⁵
B 25 B 23/157
13/46
23/143
F 16 D 7/02

識別記号 B 7181-3C
7234-3C
7181-3C
A 8508-3J

F I

技術表示箇所

審査請求 未請求 請求項の数4 OL (全10頁)

(21)出願番号 特願平5-47934

(22)出願日 平成5年(1993)3月9日

(31)優先権主張番号 特願平4-336142

(32)優先日 平4(1992)12月16日

(33)優先権主張国 日本 (JP)

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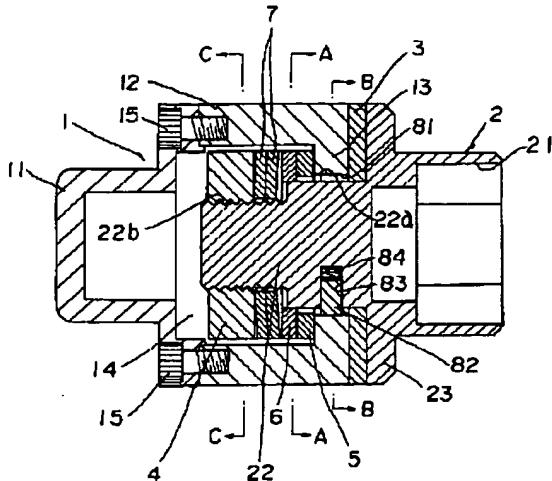
(74)代理人 弁理士 津田 直久

(54)【発明の名称】 定トルク締付具

(57)【要約】

【目的】特殊なシェアボルトを使用せず、汎用のボルトが使用できながら、任意の締付力で締付けられる定トルク締付具を提供する。

【構成】ボルト頭部又はナットなどのねじ体を被螺着部に設定トルクで締付ける定トルク締付具において、操作部11をもった第1本体1と、ねじ体を保持する保持部21をもった第2本体2とから形成し、第1本体1と第2本体2との一方に、軸部22と径大部23とを備え、他方に、軸部22に相対回転可能に支持されるトルク伝達部13を備える。そして、トルク伝達部13を軸部22に嵌合して径大部23に対向させ、これらの間に第1摩擦板3を介在し、軸部22にトルク設定調節部材4を螺合して、このトルク設定調節部材4とトルク伝達部13との間に、第2摩擦板5と押さえ板6及び第1及び第2摩擦板3、5をトルク伝達部13に押圧する弾性部材7とを介在させて、トルク設定調節部材4で締付力を調節しておく。ボルトの締付けが所定の締付力以上になると、第1本体1と第2本体2との間がスリップして、締付けができなくなる。



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【特許請求の範囲】

【請求項1】ボルト頭部又はナットなどのねじ体をねじ孔又はねじ軸などの被螺着部に設定トルクで締付ける定トルク締付具であって、操作部(11)をもった第1本体(1)と、前記ねじ体の保持部(21)をもった第2本体(2)とを備え、前記第1本体(1)と第2本体(2)との一方は、軸部(22)と径大部(23)とを備え、他方は、前記軸部(22)に相対回転可能に支持されるトルク伝達部(13)を備え、このトルク伝達部(13)と前記径大部(23)との間に第1摩擦板(3)が介在され、前記軸部(22)にはトルク設定調節部材(4)が螺合され、このトルク設定調節部材(4)と前記トルク伝達部(13)との間に、第2摩擦板(5)と押さえ板(6)及び前記第1及び第2摩擦板(3)(5)を前記トルク伝達部(13)に押圧する弾性部材(7)とを介在していることを特徴とする定トルク締付具。

【請求項2】第1本体(1)と第2本体(2)との間に、前記第1本体(1)の前記操作部(11)によるねじ体の締付方向への回転時、前記第1本体(1)を第2本体(2)に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体(1)と第2本体(2)とを一体回転可能とする一方向回転機構(8)を備えている請求項1記載の定トルク締付具。

【請求項3】第1本体(1)と第2本体(2)との一方は、空間部(14)と、この空間部(14)内に向かうトルク伝達部(13)とを備え、他方は、前記空間部(14)に装入される軸部(22)と、前記トルク伝達部(13)に対向する径大部(23)とを備え、この径大部(23)と前記トルク伝達部(13)の外面との間に第1摩擦板(3)が介装され、前記空間部(14)に装入される前記軸部(22)にトルク設定調節部材(4)が螺合され、この調節部材(4)と前記空間部(14)に向かうトルク伝達部(13)の内面との間に、第2摩擦板(5)と、押さえ板(6)及び弾性部材(7)を介在させている請求項1記載の定トルク締付具。

【請求項4】第1本体(1)の操作部(11)に径方向外方に向かって延びる握り部(16)を形成している請求項1記載の定トルク締付具。

【発明の詳細な説明】

【0001】

【産業上の利用分野】本発明は、建築部材などにおける鋼材同士を結合するために、前記鋼材間を接合部材を介してボルトまたはナットの締付けにより固定する際、予め設定する設定トルクで締付けられるようにした定トルク締付具に関する。

【0002】

【従来の技術】従来、建築部材などにおける鋼材同士を結合するために、前記鋼材間を接合部材を介してボルト

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結合させるようにしているのであるが、このとき、前記鋼材と接合部材との接合は、前記ボルトの剪断耐力を上げるために、接合面をショットブロストなどにより粗面に加工して摩擦係数を上げて接合面間の摩擦力とボルト締付力との総合により接合するようにしている。ところが、以上のように摩擦接合により鋼材間を結合する場合、ボルトを降伏点を越える程度に締付けると、接合面の摩擦接合による効果が減退し、前記ボルト自体に剪断力が作用することになり、ボルト耐力が低下する問題が生ずるのである。そこで、このボルトを所定の締付力で締付ける必要があり、このため、以上のごとく摩擦接合を行う場合においては、ボルトの先端部に所定の応力以上に力が加わると剪断するような剪断部をもつシェアボルトを用い、このシェアボルトの先端部をクランプしながら、ナットを締付けていき、ある所定の締付力になつたら、前記剪断部が剪断して、それ以上の締付力での締付けを不能にし、前記シェアボルトで設定する所定の締付トルクで締付けられるようにしたものが提案されている。

【0003】

【発明が解決しようとする課題】しかしながら、前記シェアボルトを用いる場合、前記剪断部を設けた特殊構造の専用ボルトを特別に用意する必要があつて、コスト高となる問題があるのでなく、前記シェアボルトを締付ける際には、該シェアボルトの先端部をクランプする専用の支持具が必要となり、また、締付が終了する際には、前記シェアボルトの剪断部が剪断されて、この剪断部がボルト本体から離反し、場合によっては、落下してしまうことがあり、特に高層ビルなどの高所で作業する場合に落下物が人に当たったりする恐れがあった。

【0004】従つて、本発明は、特殊なシェアボルトを使用せず、汎用のボルトが使用できながら、任意の締付力で締付けられる定トルク締付具を提供することを目的とするものである。

【0005】

【課題を解決するための手段】本発明は、上記目的を達成するために、ボルト頭部又はナットなどのねじ体をねじ孔又はねじ軸などの被螺着部に設定トルクで締付ける定トルク締付具において、操作部11をもった第1本体1と、前記ねじ体の保持部21をもった第2本体2とを備え、前記第1本体1と第2本体2との一方は、軸部22と径大部23とを備え、他方は、前記軸部22に相対回転可能に支持されるトルク伝達部13を備え、このトルク伝達部13と前記径大部23との間に第1摩擦板3が介在され、前記軸部22にはトルク設定調節部材4が螺合され、このトルク設定調節部材4と前記トルク伝達部13との間に、第2摩擦板5と押さえ板6及び前記第1及び第2摩擦板3、5を前記トルク伝達部13に押圧する弾性部材7とを介在させたのである。

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【0006】また、前記第1本体1と第2本体2との間

に、前記第1本体1の前記操作部11によるねじ体の締付方向への回転時、前記第1本体1を第2本体2に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体1と第2本体2とを一体回転可能とする一方向回転機構8を備えることが好ましい。

【0007】また、前記第1本体1と第2本体2との一方は、空間部14と、この空間部14内に向かうトルク伝達部13とを備え、他方は、前記空間部14に装入される軸部22と、前記トルク伝達部13に対向する径大部23とを備え、この径大部23と前記トルク伝達部13の外面との間に第1摩擦板3が介装され、前記空間部14に装入される前記軸部22にトルク設定調節部材4が螺合され、この調節部材4と前記空間部14に向かうトルク伝達部13の内面との間に、第2摩擦板5と、押さえ板6及び弾性部材7を介在させるようにしてもよい。

【0008】また、前記第1本体(1)の操作部(11)に径方向外方に向かって延びる握り部(16)を形成することが好ましい。

【0009】

【作用】前記トルク設定調節部材4を前記軸部22へ螺合して、該トルク設定調節部材4による前記弾性部材7への押圧力を調節することにより、前記操作部11をもった第1本体1から、前記ねじ体の保持部21をもった第2本体2への伝達トルクが調整され、締付トルクが所望のトルクに設定されることになるのであって、前記トルク設定調節部材4の押圧力を調節するだけで、前記ねじ体を締付けるときの締付トルクを所望のトルクに設定できるのであり、前記第2本体2に作用する締付負荷が予め設定する締付トルクを越えると、前記第1本体1が第2本体2に対しスリップしてそれ以上の締付けを不能にして、前記ねじ体を所定のトルクで締付けることができる。

【0010】また、本発明の定トルク締付具を使用することにより、ねじ体は特別なシェアボルトを用いることなく広く市販されている汎用のボルトを使用することができるので、シェアボルトを使用する必要があった従来に比較してコストを大幅に軽減できるし、前記第1本体1の操作部11を回転操作するための工具も例えは一般的なラチエットレンチを用いることができるのであり、その上従来のようにシェアボルトを使用していたときのボルト先端部の落下も無くせるので、落下による危険性も無くし得るのである。

【0011】また、前記第1本体1と第2本体2との間に、前記第1本体1の前記操作部11によるねじ体の締付方向への回転時、前記第1本体1を第2本体2に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体1と第2本体2とを一体回転可能とする一方向回転機構8を備えることにより、締付けたボルトを外す必要があり、しかも、該ボルトに錆付きなどが生じ、定

トルク締付具の締付力よりも大きい力でねじ体を緩めなければならない場合でも第1本体1を第2本体2に対しスリップさせることなく緩めることができるのである。

【0012】また、前記第1本体1と第2本体2との一方に、空間部14と、この空間部14内に向かうトルク伝達部13とを備え、他方に、前記空間部14に装入される軸部22と、前記トルク伝達部13に対向する径大部23とを備え、この径大部23と前記トルク伝達部13の外面との間に第1摩擦板3を介装し、前記空間部14に装入される前記軸部22にトルク設定調節部材4を螺合して、この調節部材4と前記空間部14に向かうトルク伝達部13の内面との間に、第2摩擦板5と、押さえ板6及び弾性部材7を介在するときには、前記空間部14に前記トルク設定調節部材4が内装されるので、前記第1本体1により前記トルク設定調節部材4がカバーされ、該トルク設定調節部材4で設定した締付力が外力により不用意に変動することを防止でき、予め設定する締付トルクを有效地に維持できるのである。

【0013】また、前記第1本体1の操作部11に径方向外方に向かって延びる握り部16を形成することにより、定トルクで締付け可能な握り部をもった締付具を一部品で形成できることになるので、該定トルク締付具をねじ体に合わせた後直ちに前記握り部16により前記ねじ体の締付けを行うことができるのであり、ねじ体を締付ける際に、定トルク締付具の操作部11にラチエットレンチ等をわざわざ嵌め合わせて締付けるような作業をすることなく、しかも該ラチエットレンチによる締付後に該ラチエットレンチを外すときに、前記定トルク締付具がねじ体から外れて滑り落ちるのに注意を払う必要もなく、締付け作業を容易に行えるのである。

【0014】

【実施例】本発明の定トルク締付具における第1実施例を図面に基づいて説明する。

【0015】図1に示した定トルク締付具は、ラチエットレンチなどを嵌合して締付操作を可能とする操作部11をもった第1本体1と、二つの鋼材を結合するボルトまたはナットなどのねじ体を相対回転不能に保持する保持部21をもった第2本体2とから成り、前記第2本体2に、軸部22と径大部23とを形成し、前記第1本体1に、前記軸部22に相対回転可能に支持されるトルク伝達部13を形成している。

【0016】具体的には、前記第1本体1は、図1及び図6に示すように、外面を六角形状として、その長さ方向内側にフランジ部を設けた前記操作部11と、該操作部11のフランジ部に複数のボルト15により着脱不能に結合する筒部12とから形成している。そして、前記操作部11と前記筒部12とにより、前記筒部12内部に空間部14を形成すると共に、前記筒部12の開放側には、前記空間部14内に向かって延びるトルク伝達部13を一体に形成しているのである。尚、前記操作部1

1は、その中心部を、前記空間部14に連続するように空洞状態に形成して、軽量化を図っている。

【0017】また、前記第2本体2は、図1及び図7に示すように、内面を六角形状とし、前記ねじ体を受け入れて、該ねじ体を締付けできる凹部から成る前記保持部21を形成して、該保持部21の内側に前記軸部22を連設して、この軸部22と前記保持部21との間に、これら軸部22及び保持部21の径より大きい径をもつ前記径大部23を連続的に形成するのである。そして、図2に示すように、前記軸部22の前記径大部23側に、前記第1本体1のトルク伝達部13を挿嵌する円形外周面をもったトルク伝達部挿嵌部22aを形成すると共に、前記軸部22の内端部側外周に、ねじ部22bを形成するのである。尚、前記保持部21は、開放側を六角形状とし、奥部に、円形内周面をもつように形成して、前記六角形状部でナットを保持する場合、ボルトの先端部を前記円形内周面から成る奥部で受け入れられるようしている。

【0018】そして、前記第1本体1における前記筒部12の前記空間部14に、前記トルク伝達部13の外面と前記第2本体2の前記径大部23とが対向するように、前記軸部22を装入するのであって、このとき、前記トルク伝達部13の外面と前記径大部23との間には第1摩擦板3を介在するのであり、また、前記軸部22の前記ねじ部22bには、図5に示したように外周部に回転操作用切欠41を設けたトルク設定調節部材4を螺合し、このトルク設定調節部材4と前記トルク伝達部13の内面との間に、第2摩擦板5と、押さえ板6及び前記第1及び第2摩擦板3、5を前記トルク伝達部13に押圧する主として皿ばねから成る弾性部材7、7とを介在させるのである。前記トルク設定調節部材4、第2摩擦板5、押さえ板6及び前記弾性部材7は前記筒部12内に納まるように形成している。

【0019】また、前記トルク伝達部13とトルク伝達部挿嵌部22aとの間には、前記第1本体1の前記操作部11による前記ねじ体の締付方向への回転時、前記第1本体1を第2本体2に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体1と第2本体2とを一体回転可能とする一方向回転機構8を形成するのであって、該一方向回転機構8は、図4に示すように、前記トルク伝達部13の前記トルク伝達部挿嵌部22aとの対向面となる内周面に、一方向への回転を許す複数のラチエット溝81を形成すると共に、前記トルク伝達部挿嵌部22aに、前記ラチエット溝81に嵌合するピン82を受け入れるピン受入孔83を形成して、このピン受入孔83に前記ピン82を進退自由に内装すると共に、前記ピン82の背面側にバネ84を配設して、該ピン82を前記ラチエット溝81に嵌合する方向に付勢している。

【0020】尚、前記トルク伝達部挿嵌部22aには、

図2及び図3に示すように、前記押さえ板6の内周面側に形成した一对の突起61、61が嵌合するように、一对の廻り止め用溝22cを形成し、前記押さえ板6を前記トルク伝達部挿嵌部22aに相対回転不能に支持している。

【0021】次に、前記定トルク締付具の組み付けについて説明すると、まず、前記第1摩擦板3を前記軸部22側から前記径大部23に対向するように装入した後、前記筒部12を挿嵌し、そして、前記第2摩擦板5、前記押さえ板6、前記弾性部材7、7の順に前記軸部22に挿嵌した後、前記トルク設定調節部材4を、前記軸部22に螺合して前記押さえ板6が前記弾性部材7、7により前記第1及び第2摩擦板3、5を押圧するように締付けて所定の締付トルクに設定し、かかる後、前記筒部12に前記操作部11を複数のネジ15で固定するのである。

【0022】尚、前記締付トルクの設定は、トルクレンチや荷重計を用いて行うのであって、前記調節部材4の螺合時に行うようにしてもよいが、前記調節部材4を所定回数螺合し、前記操作部11を筒部12に固定した後行うようにしてもよい。

【0023】また、前記調節部材4の調節は、前記筒部12に周方向に沿って複数の長孔を180度対向するように形成すると共に、前記トルク設定調節部材4の外周面に複数の凹部又は孔を同じく180度対向するように形成して、前記調節部材4を前記長孔に対向するまで所定回数螺合し、前記操作部11を筒部12に固定した後、前記筒部12の長孔から前記トルク設定調節部材4における180度対向している一对の凹部または孔に、該凹部または孔に嵌合可能なピン部をもつ回転操作具の前記ピン部を嵌め合わせて前記トルク設定調節部材4を回転させて締付トルクを調節するようにしてもよい。

【0024】斯くするときには、前記軸部22及びトルク設定調節部材4が前記第1本体1でカバーされているにも拘らず、締付トルクを自由に設定することができる。

【0025】しかして、前記した第1実施例におけるトルク締付具は、前記トルク設定調節部材4を前記軸部22へ螺合して、該トルク設定調節部材4による前記弾性部材7への押圧力を調節することにより、前記操作部11をもった第1本体1から、前記ねじ体の保持部21をもった第2本体2への伝達トルクが調整され、締付トルクが所望のトルクに設定されることになるのであって、前記トルク設定調節部材4の押圧力を調節するだけで、前記ねじ体を締付けるときの締付トルクを所望のトルクに設定できるのであり、前記第2本体2に作用する締付負荷が予め設定する締付トルクを越えると、前記第1本体1が第2本体2に対しスリップしてそれ以上の締付けを不能にして、前記ねじ体を所定のトルクで締付けることができる。

【0026】また、本発明の定トルク締付具を使用することにより、ねじ体は特別なシェアボルトを用いることなく広く市販されている汎用のボルトを使用することができるので、シェアボルトを使用する必要があった従来に比較してコストを大幅に軽減できるし、前記第1本体1の操作部11を回転操作するための工具も例えは一般的なラチエットレンチを用いることができるのであり、その上従来のようにシェアボルトを使用していたときのボルト先端部の落下も無くせるので、落下による危険性も無くし得るのである。

【0027】従って、本発明は、特殊なシェアボルトを使用せず、汎用のボルトが使用できながら、任意の締付力でボルトを締付けることができるのである。

【0028】また、前記第1本体1と第2本体2との間に、前記第1本体1の前記操作部11によるねじ体の締付方向への回転時、前記第1本体1を第2本体2に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体1と第2本体2とを一体回転可能とする一方向回転機構8を備えることにより、締付けたボルトを外す必要があり、しかも、該ボルトに銷付きなどが生じ、定トルク締付具の締付力よりも大きい力でねじ体を緩めなければならない場合でも第1本体1を第2本体2に対しスリップさせることなく緩めることができるのである。

【0029】また、前記空間部14に前記トルク設定調節部材4が内装されるので、前記第1本体1により前記トルク設定調節部材4がカバーされ、該トルク設定調節部材4で設定した締付力が外力により不用意に変動することを防止でき、予め設定する締付トルクを有効に維持できるのである。

【0030】尚、前記軸部22に嵌合する押さえ板6は、一枚に限らず複数枚使用してもよいし、また、前記弾性部材7、7は、一枚でもよいし、多数枚使用してもよいのであり、また皿ばねに限らずコイルばねでもよい。前記押さえ板6を複数枚使用するときには、該押さえ板6と前記弾性部材7を交互に重ね合わすことが好ましい。

【0031】また、前記保持部21は、内面を六角形状に形成して、該六角形状部にボルト頭部やナットを嵌め合わせるようにしたが、前記保持部21は、ボルト頭部やナットの大きさの変化に対応できるように、チャック方式にして、ボルト頭部やナットを掴むようにしてもよい。

【0032】さらに、締付トルクを設定するために、図15に示すように、前記軸部22と前記トルク設定調節部材4とにトルク調節目盛りを形成することによりトルク設定を容易に行えるようにしてもよい。

【0033】次に第2実施例について説明する。この第2実施例の前記第1実施例と異なる点は、前記一方向回転機構8のラチエット溝とピンとを逆にしただけである。

【0034】即ち、図8乃至図11に示すように、前記筒部12に形成する前記トルク伝達部13の内周面に、ピン82を受け入れるピン受入孔83を形成して前記ピン82とバネ83とを内装すると共に、前記軸部22における前記トルク伝達部押嵌部22aに、前記ピン82が嵌合して、一方向への回転を許す複数のラチエット溝81aを形成したものである。

【0035】また、前記した第2実施例において、前記第1摩擦板3の内周面の径を大きく形成し、前記軸部22における前記第1摩擦板3を受ける部分の径方向寸法を大きく形成しているので、前記保持部21におけるボルトの受け部を図8に示す保持部21の形成位置よりも内方に形成することができるのであって、斯くするときには、前記保持部21を内方に形成する分だけ、定トルク締付具の全体の長さを短くできるのである。

【0036】また、前記第1摩擦板3は、前記トルク伝達部13における前記径大部23との対向面側に、前記ピン受入孔83に影響しないように段部を形成して、該段部に前記第1摩擦板3を嵌め合わせるようにして、前記第2摩擦板5と前記トルク伝達部13に対して非対称位置になるように配設するようにしてもよい。

【0037】尚、前記した各実施例は、前記第1本体1を操作部11と筒部12から形成したが、図12に示した第3実施例のように、前記第1本体1は、板状として、その外周部に操作部11を形成し、内周部に前記トルク伝達部13を形成してもよい。この場合、前記第2本体2における前記軸部22に、該軸部22に嵌合する前記第2摩擦板5、押さえ板6、弾性部材7、7、トルク設定調節部材4を覆うカバー9を設け、該カバー9の中央部を前記軸部22の先端部にねじ91により固定するのが好ましい。

【0038】斯くするときには、前記操作部11と前記保持部21との長さを短くできるので、定トルク締付具にかかる捩じり応力を軽減できるし、また、こぜの発生も少なくできる。

【0039】また、前記した各実施例は、前記第1本体1にトルク伝達部13を、第2本体2に軸部22及び径大部23を形成したが、前記第1本体1に軸部及び径大部を形成し、第2本体2にトルク伝達部を形成するようにしても差し支えない。

【0040】また、前記各実施例では、前記保持部21を、ボルト頭部やナットの形状に合わせた六角形状にして、該保持部21に直接ボルト頭部またはナットを嵌合して締付けを行うようにしたが、前記保持部21の内面を例えは四角形状に形成して、図13に示すように前記保持部21の内面の面積より小さい、六角形状の内面積をもち、前記保持部21に嵌合可能なソケット92を前記保持部21に嵌合して、前記ソケット92を前記保持部21に抜け止め93により着脱可能に取付けるように

50 してもよいし、また、前記保持部21の内面を同じく四

角形状に形成して、図14に示すように一方側に、前記保持部21の内面の面積より大きい、六角形状の内面積部をもつ、他方に前記保持部21に嵌合可能な嵌合部をもつソケット94を前記保持部21に嵌合して、前記ソケット94を前記保持部21に抜け止め93により着脱可能に取付けるようにしてもよい。前記抜け止め93の背面側には、該抜け止め93を前記保持部21の内面側に付勢するばね95を配設している。

【0041】斯くするときには、前記ソケット92、94を別に用意し、ボルトやナットの大きさに合わせて前記ソケット92、94を取り換えるだけで、これらボルトやナットの大きさが変わっても一つの定トルク締付具で締付けることができる。尚、図13及び図14に示す前記各実施例では、前記保持部21を、筒状に形成したが、外形が多角形状の軸に形成し、該軸の外面に筒状のソケットを嵌合するようにしてもよい。

【0042】また、図16及び図17に第4実施例を示すと、該実施例は、前記第1本体1の操作部11にラチエットレンチを一体に結合したものであって、前記第1本体1を段付き筒状に形成して、該第1本体1の大径部外周に、複数の歯部11aを形成して操作部11を構成すると共に、該操作部11より小径の外径をもつ小径部となる筒部12内方には、前記軸部22に嵌合する前記第2摩擦板5、押さえ板6、弾性部材7、7、トルク設定調節部材4を内装して、前記小径部12で覆い、また、前記操作部11に対応した内周部には前記トルク伝達部13を形成している。また、前記第2本体2における前記軸部22には、前記第1本体1の筒部12開口側を覆うカバー9を設け、該カバー9の中央部を前記軸部22の先端部にねじ91により固定している。

【0043】そして、前記操作部11には、前記第1本体1外周部から径方向外方へ延びる握り部16を取付けるのであって、握り部16の長さ方向一側には、複数の歯部11aから成る前記操作部11に嵌合する枠状ボス部16aを設けると共に、前記ボス部16aには、該ボス部16aの内側空所に開口する爪保持空間16cを設けて、この空間16cに、前記操作部11の歯部11aに係合し、ねじ体の締付方向を切り替え可能にする2つの爪部17a、17bをもつ爪体17をピン16dを介して切り替え可能に枢着する一方、前記爪体17を、前記操作部11の歯部11aに付勢して前記爪体17の切り替え位置を保持するボール16eとばね16fとからなる爪体切換保持機構を設けている。

【0044】しかして、以上の構成により、前記握り部16は、前記操作部11と共にラチエットレンチを構成することになるのであって、前記爪体17を切換えて、締め込み用爪部17aを前記操作部11の歯部11aに噛み合わせることにより前記握り部16の一方向往動操作を前記操作部11から第1本体1に伝達でき、他方向復動操作をフリーとして、前記握り部16の往復操作で

前記第1本体1を一方向に駆動回転し、前記第2本体2の保持部21を介してねじ体の締め込みができることになるのである。

【0045】また、前記爪体17の締め戻し用爪部17bを前記操作部11の歯部11aに噛み合わせることにより、前記操作には逆に、前記握り部16の一方向往動操作をフリーとして、他方向復動操作を前記操作部11から第1本体1に伝達できるのであって、前記握り部16の往復操作により前記ねじ体の締め戻しができるのである。

【0046】また、前記握り部16は、前記枠状ボス部16aの軸方向一側に、前記第1本体1における前記操作部11を構成する大径部より小径とした内周面をもつ内向きフランジ部16gを設け、このフランジ部16gを前記大径部と小径部12との間に形成される段部に係合させて、前記フランジ部16gをこの段部と前記軸部22に取付ける前記カバー9の端部とにより挟持されることにより前記握り部16を前記第1本体1に離脱不能に保持するのである。

【0047】斯くすることにより、前記握り部16を第1本体1に離脱不能に取付けられるから、前記第1本体1と第2本体2とから成る定トルク締付具と握り部16とを一部品にでき、第1実施例のように、ラチエットレンチを締付操作時に嵌合させる必要はなく、前記定トルク締付具をねじ体に嵌合させた後直ちに前記握り部16により前記ねじ体の締付けを行うことができるのであり、第1実施例のようにねじ体を締付ける際に、定トルク締付具の操作部11にラチエットレンチをわざわざ噛み合わせる作業を不要にでき、それだけ作業性を向上できるし、しかもラチエットレンチによる締付後に該ラチエットレンチを外すときに、前記定トルク締付具がねじ体から外れて滑り落ちるのを防止でき、従って、作業時落下しないように注意を払う必要もなく、それだけ締付け作業を容易に行えるのである。

【0048】また、前記第4実施例では、前記握り部16をラチエットレンチ形式としたが、図18に示す第5実施例のように、前記握り部16のボス部16aに、前記操作部11の歯部に係合する歯部16hを形成して、該ボス部16aを前記第1本体1に嵌合させて、前記操作部11に相対回転不能に結合させるようにしてもよい。このとき、前記握り部16の前記第1本体1への取付けは、該第1本体1の外周部に前記枠部16aを係止するスナップリング16iを取付けて、該スナップリング16iと、カバー9の端部とにより挟持するようにして保持するのである。

【0049】また、前記握り部16は、前記第1本体1に一体形成してもよい。

【0050】

【発明の効果】以上説明したように、本発明の定トルク締付具は、操作部11をもつ第1本体1と、前記ねじ

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体の保持部21をもった第2本体2とを備え、前記第1本体1と第2本体2との一方は、軸部22と径大部23とを備え、他方は、前記軸部22に相対回転可能に支持されるトルク伝達部13を備え、このトルク伝達部13と前記径大部23との間に第1摩擦板3が介在され、前記軸部22にはトルク設定調節部材4が螺合され、このトルク設定調節部材4と前記トルク伝達部13との間に、第2摩擦板5と押さえ板6及び前記第1及び第2摩擦板3、5を前記トルク伝達部13に押圧する弾性部材7とを介在させたから、前記トルク設定調節部材4を前記軸部22へ螺合して、該トルク設定調節部材4による前記弾性部材7への押圧力を調節することにより、前記操作部11をもった第1本体1から、前記ねじ体の保持部21をもった第2本体2への伝達トルクが調整され、締付トルクが所望のトルクに設定されることになるのであって、前記トルク設定調節部材4の押圧力を調節するだけで、前記ねじ体を締付けるときの締付トルクを所望のトルクに設定できるのであり、前記第2本体2に作用する締付負荷が予め設定する締付トルクを越えると、前記第1本体1が第2本体2に対しスリップしてそれ以上の締付けを不能にして、前記ねじ体を所定のトルクで締付けることができる。

【0051】また、本発明の定トルク締付具を使用することにより、ねじ体は特別なシェアボルトを用いることなく広く市販されている汎用のボルトを使用することができるので、シェアボルトを使用する必要があった従来に比較してコストを大幅に軽減できるし、前記第1本体1の操作部11を回転操作するためのT.具も例えば一般的なラチエットレンチを用いることができるのであり、その上従来のようにシェアボルトを使用していたときのボルト先端部の落下も無くせるので、落下による危険性も無くし得るのである。

【0052】また、前記第1本体1と第2本体2との間に、前記第1本体1の前記操作部11によるねじ体の締付方向への回転時、前記第1本体1を第2本体2に対し回転可能とし、前記ねじ体の戻し方向への回転時、前記第1本体1と第2本体2とを一体回転可能とする一方向回転機構8を備えることにより、締付けたボルトを外す必要があり、しかも、該ボルトに錆付きなどが生じ、定トルク締付具の締付力よりも大きい力でねじ体を緩めなければならない場合でも第1本体1を第2本体2に対しスリップさせることなく緩めることができる。

【0053】また、前記第1本体1と第2本体2との一方に、空間部14と、この空間部14内に向かうトルク伝達部13とを備え、他方に、前記空間部14に装入される軸部22と、前記トルク伝達部13に対向する径大部23とを備え、この径大部23と前記トルク伝達部13の外面との間に第1摩擦板3を介装し、前記空間部14に装入される前記軸部22にトルク設定調節部材4を螺合して、この調節部材4と前記空間部14に向かうト

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ルク伝達部13の内面との間に、第2摩擦板5と、押さえ板6及び弾性部材7を介在するときには、前記空間部14に前記トルク設定調節部材4が内装されるので、前記第1本体1により前記トルク設定調節部材4がカバーされ、該トルク設定調節部材4で設定した締付力が外力により不用意に変動することを防止でき、予め設定する締付トルクを有効に維持できるのである。

【0054】また、前記第1本体1の操作部11に径方向外方に向かって延びる握り部16を形成することにより、ラチエットレンチなどの治具を別に用意する必要なく前記握り部を締付具に組込んで一部品にできるから、該定トルク締付具をねじ体に合わせた後直ちに前記握り部16により前記ねじ体の締付けを行うことができるのであり、ねじ体を締付ける際に、定トルク締付具の操作部11にラチエットレンチ等をわざわざ嵌め合わせて締付けるような作業をすることなく、しかも該ラチエットレンチによる締付後に該ラチエットレンチを外すときに、前記定トルク締付具がねじ体から外れて滑り落ちるのに注意を払う必要もなく、締付け作業を容易に行えるのである。

【図面の簡単な説明】

【図1】本発明の定トルク締付具における第1実施例の縦断面図である。

【図2】第1実施例における第2本体の軸部を示した一部切欠側面図である。

【図3】図1のA-A断面図である。

【図4】図1のB-B断面図である。

【図5】図1のC-C断面図である。

【図6】図1の第1本体側から見た正面図である。

【図7】図1の第2本体側から見た背面図である。

【図8】本発明の定トルク締付具における第2実施例の縦断面図である。

【図9】第2実施例における第2本体の軸部を示した一部切欠側面図である。

【図10】図1のD-D断面図である。

【図11】図1のE-E断面図である。

【図12】本発明の定トルク締付具における第3実施例の縦断面図である。

【図13】本発明の定トルク締付具における保持部にソケットを取付けた図を示す一部切欠断面図である。

【図14】本発明の定トルク締付具における保持部にソケットを取付けた図を示す一部切欠断面図である。

【図15】本発明の定トルク締付具における軸部とトルク設定調節部材にトルク調節目盛りを設けた図面である。

【図16】本発明の定トルク締付具における第4実施例の部分縦断面図である。

【図17】図16の第4実施例におけるF-F部分断面図である。

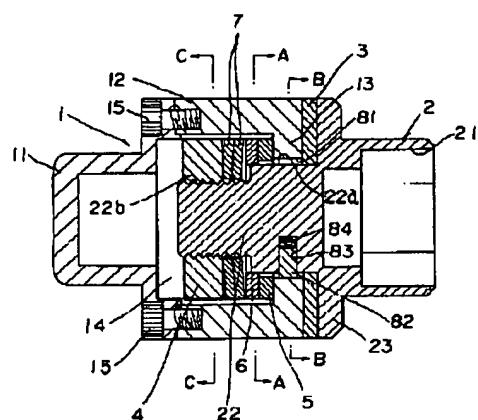
【図18】本発明の定トルク締付具における第5実施例

の部分断面図である。

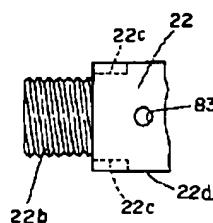
【符号の説明】

1	第1本体	22	軸部
11	操作部	23	径大部
13	トルク伝達部	3	第1摩擦板
14	空間部	4	トルク設定調節部材
16	握り部	5	第2摩擦板
2	第2本体	6	押さえ板
21	保持部	7	弾性部材
		8	一方向回転機構

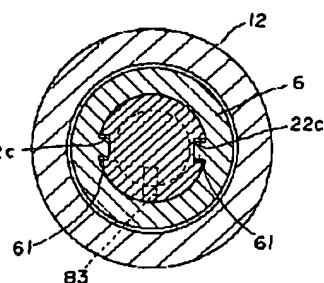
【図1】



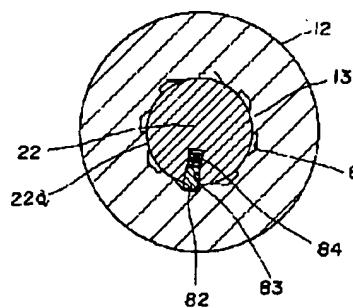
【図2】



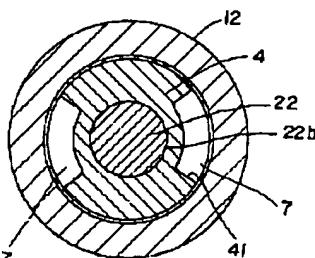
【図3】



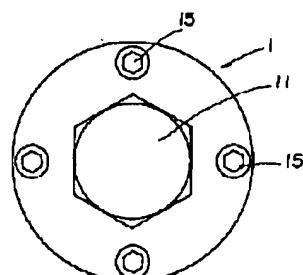
【図4】



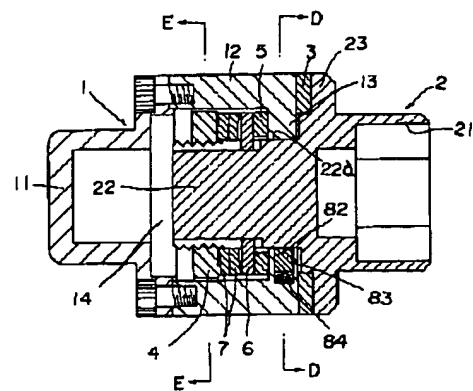
【図5】



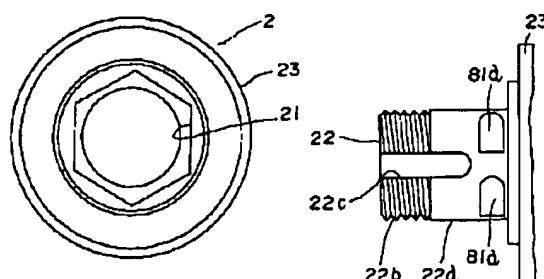
【図6】



【図8】



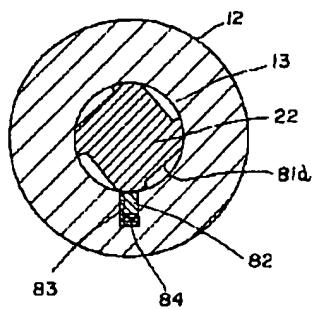
【図7】



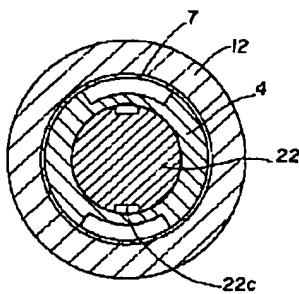
【図9】

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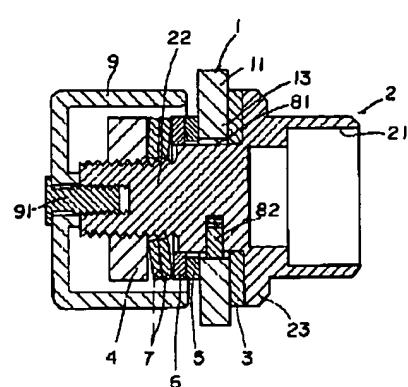
【図10】



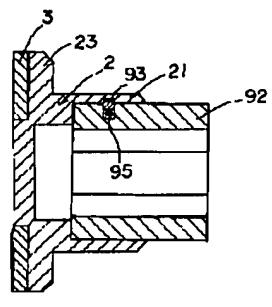
【図11】



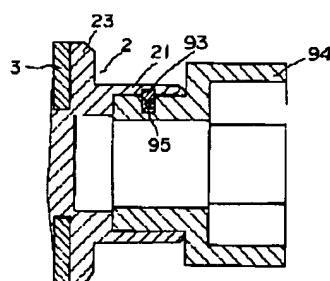
【図12】



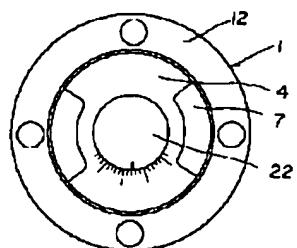
【図13】



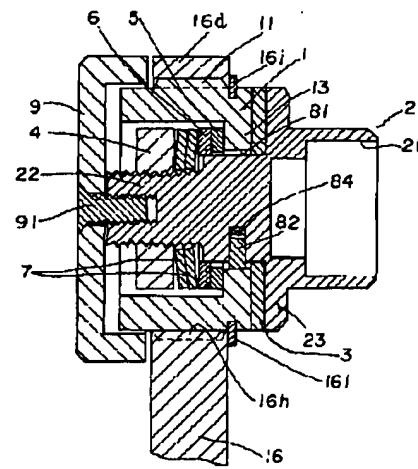
【図14】



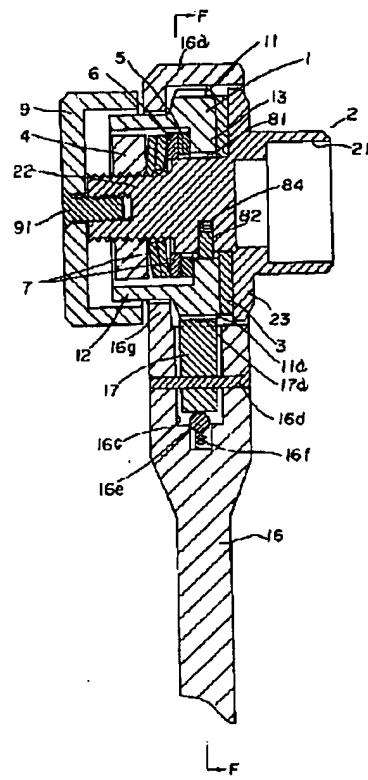
【図15】



【図18】



【図16】



【図17】

